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1. INTRODUCTION

During the last years, there has been an increasing concern about the importance of competition policy as a mean to increase efficiency in the allocation of resources and the supply and variety of goods and services. Competition between firms provides powerful incentives for cost minimization and technological improvements and also contributes to create an environment where firms can develop, encouraging free enterprises in the best interests of users and consumers.

Both competition policy and regulation are public instruments that aim at improving the functioning of the market. Competition defense tries to avoid that firms abuse of their dominant position, or collude, or deny mergers and concentration operations that facilitate such conducts. Competition policy and regulation are complementary policies, which require an effective coordination between them.

During the 90's, the Latin American region has experienced an extended process of structural reforms, including privatization, deregulation and in particular, Competition Law implementation. All these major changes required an active role of the State. However, different models of Competition Agencies were created among the region. These differences can be related to the particular necessities and peculiarities of the different countries. In such a context, many questions arise like, How do the structural reforms affect the competition policy in LA? What was the impact of the competition law on the different markets? Have the different models of competition implementation been effective in the fulfillment of the objectives? Is there any significant difference between the alternatives? Which are the problems that a competition agency has to face in order to reach its aims? All these questions are related and motivate the elaboration of this paper.

The goal of this paper is to develop a methodology to classify the different models of Competition Agencies that were created in Latin America during the 90's. This taxonomy requires the analysis of some dimensions, such as: whether the agency is independent or not, whether the agency control mergers or not and whether the final decision is made at the judiciary level or at the administrative level.

The main objective is to determine if there is any relationship between these characteristics and the model of Competition Agency adopted; in other words, if there is a particular type of agency that tends to be more effective than other pursuing anticompetitive conducts. In order to measure this effectiveness, we construct partial

productivity indexes. Firstly, based on these indexes we compare and contrast the different Agencies.

Secondly, we define some measure of output generated by each agency based on the partial productivity indexes and we try to evaluate the use of resources and the significance that structural and environmental variables have on the output of each Agency. The paper relates these indexes to the requirement of resources and factors such as the size of the economy, the degree of openness of the economy, the faculties of the Agencies. The methodology provides an interesting approach that aims at improving the quantitative analysis on competition issues and increasing the information a regulator or a policy maker should rely on in order to assess the implications of any political decision.

The paper structures as follows. In the second section, we present a description of the different legal frameworks and competitive environments of the countries under analysis. We consider: Argentina, Perú and Chile. The objective is to identify their major attributes, compare and contrast them, in order to shed light about its advantages and weaknesses. The section is closed with a comparative chart. The third section presents principal cases where the Competition Law has been implemented that might help to compare the different agencies in a qualitative and quantitative way. In the fourth section, we try to estimate the relationship, if any, between the different models of competition agencies and its enforcement capacities, as well as its impact on the market. The aim is to assess whether there is any statistical relationship between the taxonomy of Agencies and their effectiveness in the improvement of the competitive environment. Finally, section five present the conclusions.

2. DESCRIPTION OF THE COMPETITION FRAMEWORK OF THE COUNTRIES SELECTED

2.1 Argentina

2.1.1 The Competition Law

In 1980 Argentina initiated its modern competition policy, with the creation of the Competition Act N° 22.262. Since then, the National Commission for Competition Defense - CNDC¹ has enforced Argentinean Competition Law.

However, in 1999 Law N° 22.262 was replaced by Act 25.156 which basically completed and improved the former Act by: i) introducing ex ante review and authorisation of mergers and acquisitions, ii) giving the competition authority full jurisdiction on competition issues in every sector of the economy and iii) ordering the setting up of the National Tribunal for Competition Defense -TNDC² as an independent body to enforce the law within the Ministry of Economy. The Amendment of the Law aimed at increasing the enforcing power of the Antitrust Agency and also introduced merger control as a preventive tool in the fight against cartels to minimize costs to all parties.

Law N° 25156 constitutes the legal framework to enforce the competition policy. It regulates the agreements and anticompetitive practices that restrain the markets, as well as the abuse of dominant position. Even though the Law establishes the creation of TNDC, the

CNDC still is in charge of enforcing the Competition Law. The TNDC is in process of constitution.

CNDC is the agency that performs the investigations, which end up in reports and recommendations based on the legal and economic antitrust principles. Both mergers and antitrust investigations are subject to the antitrust analysis performed by CNDC. The agency also advocates for competition, issuing non-binding recommendations on competition matters to other governmental agencies.

The CNDC³ nowadays reports to the Technical Co-ordination Secretariat of the Ministry of Economy and Production.⁴

The main functions and faculties of the TNDC are the following:

- Conduct the market investigations in order to determine if there is any anticompetitive practice taking place. An investigation can be opened by a formal complaint or by initiative of the Tribunal.
- Ask for information, conduct public audiences. About investigative techniques, inquires and down raids are available in order to gather evidence that justify the decisions taken
- Impose sanctions. The amendment of the Law increased the Agency's capacity to impose sanctions and measures to re-establish competition in any market
- Emit pro competitive recommendations, promoting its advocacy role.
- Elaborate cautious measures
- Participate in the Negotiation of International Treaties, Collective Agreements, related to competition issues.
- Encourage agreement between parties.

Some major legal innovations on competition framework took place during 2001, when the new Competition Act 25.156 was complemented by Decree 89/2001 and amended by Decree 396/2001. Decree 89/2001 defined the necessary proceedings for the creation of the aforementioned TNDC and regulated some aspects concerning the notification of mergers and acquisitions to the authority. Additionally, it incorporated the Competition, Deregulation and Consumer Defense Secretariat as an enforcement authority, giving exaggerated influence on the investigations. In particular, the Decree allowed the Secretariat to participate in any instance of an investigation, which contradicted the independence principle of the Tribunal.

Decree 396/2001 amended the volume of sales threshold by which mergers and acquisitions must be notified to CNDC in order to avoid notification and investigation of minor operations. In turn, Decree 89/2001 was complemented by Resolutions N° 40⁵ and N° 164⁶.

Regarding mergers, Article 6° of the Law 25.156 defines an operation of "economic concentration" as changes in control over one or more undertakings, through the following transactions: a) mergers between undertakings, b) acquisitions of a business, c) acquisitions of shares or any other rights related to shares or debt giving any kind of influence over the firm issuing those shares or debt, when that acquisitions gives the buyer control or substantial influence over an undertaking, and d) any other agreement or transaction that

transfers, de iure or de facto, to a person or an economic group the assets of an undertaking or gives a determinative influence over ordinary or extraordinary business decisions.

Article 8° of the Act and its implementing regulation, Decree 89/2001, establish that operations falling within Art. 6° must be notified when the total turnover of the acquiring and target group of companies exceed the amount of Pesos \$ 200 million within Argentina. Economic concentrations must be notified before or within a week after the conclusion of the agreement, or the announcement of the public bid, or the acquisition of a controlling interest⁷. There is no adjustment of the thresholds. Any adjustment would only be possible by a change in the law.

Article 7° of the Act (with modifications according to Decree N° 396/01) sets the substantive standard for assessing a merger. It prohibits economic concentrations, which have as object or effect a restriction, or distortion of competition in a way that may result against the general economic interest. This provision can be understood as implying an SLC Test (substantial lessening to competition).

Article 13° of the Act states that the Competition Authority must decide on a notified operation within the term of forty five (45) days after the date of the notification. Days are working days. Article 14° states that if that term elapses without a resolution, the notified operation must be automatically considered authorised. There have never been mergers tacitly authorised according to Art. 14.

Regarding the relationship between competition policy and regulation, Law N° 25156 derogates any competition faculty to other public office and centralise it on the TNDC.

2.1.2 The Competition Authority

As already mentioned, the Amendment of the Law aimed at increasing the enforcement power of the Agency in order to increase its effectiveness and widen its scope including all the sectors of the economy. It created the National Tribunal for Competition Defense - TNDC⁸ as an independent body to enforce the law within the Ministry of Economy. However, the TNDC has not been created yet.

At the moment, the CNDC⁹ is in charge of enforcing the Law. It reports to the Technical Co-ordination Secretariat of the Ministry of Economy and Production. Its decisions are non binding recommendations, which are reported to The Secretariat who takes the final decisions about anticompetitive conducts and mergers & acquisitions based on CNDC technical reports. Nevertheless regularly those final decisions follow CNDC's recommendations. This decision process clearly reduces the effectiveness of the measures taken, as there is a probability that the reports emitted by the CNDC are not followed by the Secretariat. Additionally, it generates significant transactions costs.

The CNDC consists of a President and four Commissioners, who are advised by a Chief Economist and a Chief Attorney and a staff of approximately 35 lawyers and economists or accountants.

In turn, TNDC will be constituted by seven members, to be appointed by the President of the Republic after a selection process, involving a public contest, which includes examinations and interviews before a special jury. According to the new Act, the jury has been composed by representatives of each branch of the government and of remarkable

academic bodies¹⁰. The special jury was constituted in December 2002 and the selection process of the candidates has already begun.

The Members of the Tribunal last in their functions 6 years and can be re elected indefinitely by the former procedure. The renovation of the Tribunal will be done partially: 3 Members after three years and the remaining 4 three years later. They can be removed from its functions only by the jury and by majority.

2.1.3 Some Preliminary Conclusions about the Competition Agency in Argentina

Even though the amendment of the law aimed at increasing the enforcement power of the Antitrust Agency, the evidence considered allow us to argue that those objectives have not been fulfilled up to the moment.

Firstly, the National Tribunal has not been settled yet and the CNDC remains in charge of enforcing the Law. As already mentioned, the faculties and functions of the Commission as well as its structure evidenced some major drawbacks that need to be remedied in the shorter term. This task has been postponed which damages the authority reputation to fulfil its proposed objectives.

Secondly, successive amendments to the Law have reduced its effectiveness in the enforcement of the competition framework, such as the introduction of more influence to the role of the Secretariat during any investigation and the changes of the thresholds to notify a concentration operation.

2.2. Perú

2.2.1 Legal Framework

The Constitution of Perú, dated from 1993, establishes that one of the government functions is to encourage free competition, prohibiting the abuse of dominant position and the existence of monopolies (Article 61).

Prior to 1991, there was not any law that properly defines the anticompetitive practices. Legislative Decree N° 701 gives the basis of Anticompetitive Law. The purpose of the Law was to eliminate the monopolistic practices that control and restrict free competition in the production and commercialisation of goods and services, encouraging free enterprises in the best interests of users and consumers.

In Article 3°, it is settled that ... “any acts or conduct related to economic activities constituting an abuse of a dominant position¹¹ in the market or limiting, restricting or distorting the free competition¹², in such a way that damages to the general economic interest in the national territory are forbidden and will be punished.

The Antitrust Agency in charge of enforcing the competition Law is the National Institute of Free Competition and Intellectual Property Rights Protection (INDECOPI). The list of restricted practices include horizontal and vertical practices and the criteria followed by INDECOPI is the rule of reason. However, the Tribunal follow not only the rule of reason criteria, but also the per se rule. In case of a procedure about abuse of dominant position or collusive practices between competitors, the general criterion followed is the

rule of reason. On the contrary, in some particular cases, like price agreement, market separation, collusion in public auctions, the criteria is the per se rule.

The Antitrust Law in Perú does not include merger control. The rationale of that is that the Competition Law regulates firm conducts but not the structure of the industries. However, there is one exception to the previous rule, which is the electricity sector. This sector as well as telecommunications differs from the rest of the sectors of the economy. Therefore, they are worth to analyse separately.

The electricity sector in Perú initiated some major economic reforms in 1992, including privatisation and deregulation of the markets. The regulatory and legal framework since then set the rules for the granting of concessions in a competitive environment. New rules for the fixing of tariffs and market entry were established. In this context, the former public enterprises were vertically divided in the following units: generation, transmission and distribution. Private investment was encouraged. Generation was considered as a competitive market, prior to authorisation or concession by the public regulator.

Regarding public institutions participating in this market, the activities of co-ordination of energy distribution, fixing of tariffs, general regulation, fiscalisation and competition were divided between different governmental agencies. In respect of competition, INDECOPI was in charge of enforcing the competition Law in the sector. As mentioned before, this is the only sector where the Competition Agency has faculty to control mergers.

Law N° 26876 defines the Antitrust and Antioligopoly Law for the Electricity Sector. Its Article 1 defines that “both types, vertical or horizontal mergers that will take place on generation and/or transmission and/or distribution activities of the electric energy will be subject to a prior permission procedure”... “in order to avoid acts of concentration that tends to diminish, lessen, damage or prevent competition and the free concurrence in the markets of the activities mentioned before or on the related markets.”

Article 3 establishes that all the concentration operations that, directly or indirectly involve companies that develop activities of generation and/or transmission and/or distribution of electrical energy that account previous or afterwards, in a joint or separate way, a market share equal or greater to 15% in the cases of horizontal concentration have to request permission. In the case of acts of vertical concentration, they have to notify all operations that involve, directly or indirectly companies that account previous or afterwards a market share equal or greater to 5% of any of the involved markets.

Therefore, only in this sector there is an explicit worry from the state to prevent any process of concentration in the market that might potentially affect competition and worsen consumers and/or users welfare. This contradicts the general criteria through which the impact of competition policy is only ex post and at the same time, introduces asymmetries in the legal framework.

The second sector that it is worth to analyse is telecommunications. In this sector it is not INDECOPI but an Institution called OSIPTEL in charge of enforcing the Competition Law. Additionally, OSIPTEL regulates the market. The Decrees N° 701 and 702 give power to INDECOPI to enforce the Law in general and to OSIPTEL in particular, in telecommunications. This fact again raises a question about the existence of asymmetry between the different sectors, which also reduces the effectiveness in the enforcement of the antitrust framework.

OSIPTEL can formulate non-binding guidelines for the sector and it is also in charge of preventing anticompetitive practices and can impose sanctions to firms that operate in telecommunication sector.

Regarding the legal framework for the sector, the criteria is that in the first place the specific norms must be applied and complementary and extensively to that, the general competition rules. In other words, through the application of the general legal framework of competition it is possible to remedy competitive problems that are not dealt properly in the specific norm.

However, the previous criteria mean that the application of the law is not uniform to all the sectors and it contradicts the principle of specialisation in the public function.

2.2.2 The Competition Agency

In 1992, Law N° 25868 created the National Institute of Free Competition and Intellectual Property Rights Protection (INDECOPI). INDECOPI is in charge of enforcing the Competition Law (Decree 701 and its Amendments). It is organised in 4 bodies: the Directory, the Functional Units, the Area of Economic Research and the Administration. The Functional Units are the Unit of Free Competition and the Unit of Property Rights that together they constitute the Tribunal of Free Competition and Intellectual Property.

The Free Competition Unit is divided into:

- The Commission of Consumer Protection
- The Commission of Fair Trade,
- The Commission of Free Competition
- The Commission of Dumping and Subsidies Repression
- The Commission of Free Access to Markets
- The Commission of Technical and Commercial Registrations.

INDECOPI depends on the Ministry of Industry, Tourism, Integration and International Commercial Negotiations. It is a body with technical, economical and administrative autonomy and its Commissions are technically and functional autonomous.

The Directory is the maximum instance and it is integrated by 3 members, two representatives of the Industry Ministry and one representative of the Ministry of Economy. They are elected by the Executive Power.

The Unit of Free Competition and the Unit of Property Rights (which constitute The Tribunal of Free Competition and Intellectual Property) receive and deal with the appeals to the decisions taken by each INDECOPI 's Commission. The Unit of Free Competition is integrated by 6 members and the Unit of Property Rights by 4, elected by proposal of the Directory and approved by the Ministry of Industry. Regarding the members of each Commission, they are elected by the Directory for a non-determined period.

Regarding the decisions taken by each of the units, the administrative instance is finished once the Tribunal of Free Competition and Intellectual Property has made its decision. Only then, the decision can be appealed to the Judiciary Power.

The Commission of Free Competition can impose sanctions and emit cautionary measures. Regarding sanctions, the severity of them depends on the following aspects:

- The scope and the characteristics of the anticompetitive conduct
- The size of the market
- The market share of the firm(s)
- The effect on competitors, consumers and users and the duration of the practice.

2.2.3 Some Preliminary Conclusions about the Competition Authority in Perú

From the previous paragraphs, there are some points to highlight in order to assess the efficacy of the Antitrust Agency to enforce the Competition Law. The legal framework presents some caveats that lessen its impact on the competitive environment.

Firstly, the lack of a unique Antitrust Agency with uniform attributes in all sectors; the Competition faculties are not centralised in one Agency. As mentioned before, in telecommunications, it is not INDECOPI but OSIPTEL who is in charge of enforcing the Competition Law.

The fact that application of the law is not uniform to all the sectors contradicts the principle of specialisation in the public function, which says that the Antitrust Agency should be competent in all the sectors transversally, while the sectorial regulators should have only responsibilities related to economic regulation in the particular markets. However, in the case of OSIPTEL, it acts as a sectorial regulator and also has competition responsibilities. This distorts the markets and reduces the effectiveness of the competition policy.

Secondly, there is some overlapping of functions between the different government agencies. Considering electricity sector, there are a diversity of institutions dealing with the activities of co-ordination of energy distribution, fixing of tariffs, general regulation, fiscalisation and competition. The lack of a clear delimitation of responsibilities also damages the effectiveness of the competition policy.

Related to the previous points, the asymmetry between sectors is also worth to highlight. The legal competition framework does not contemplate merger controls. However, there is one sector in which vertical or horizontal mergers has to be subject to a prior permission procedure in order to avoid acts of concentration that tends to diminish, lessen, damage or prevent competition. This is the electricity sector.

Fourthly, during the 90's there has been a process of deregulation and private capital income that altered the competitive environment of many markets and, in particular, markets where there are natural monopolies. In this context, the lack of a Competition Authority able to analyse the impact on competition of this concentration process remains a serious drawback.

Fifthly, a point can be made regarding the insufficient level of autonomy of the Antitrust Agency. On the one hand, the members of the Commission and Tribunals are elected by the Executive Power, thus lacking of enough independence. On the other hand, the decisions taken are non-binding. For instance, OSIPTEL can formulate non-binding guidelines for the sector and it is also in charge of preventing anticompetitive practices. This again

reduces the effectiveness and impact of any determination. Decisions taken by the Commission are firstly appealed to the Tribunal in order to complete the administrative instance and only then to Justice.

The coexistence of numerous institutions and complex procedures to enforce the law also damages the enforcement power of any Antitrust Agency.

2.3 Chile

2.3.1 Legal Framework

Chile's current competition law was adopted in 1973, but it was in November of 2003 that Chilean Law No. 19.911 amended the prior competition law by creating a new Competition Tribunal and introducing a number of other reforms.

Article 1 of the law contains a very broad prohibition of acts or agreements ... "attempting to restrain free competition in business activities...". This ban is a criminal provision, but the law's civil aspects predominate. As amplified somewhat by Article 2's illustrative list of behaviours deemed to tend to restrain free competition and Article 6's passing reference to ... "any abuse incurred by whosoever monopolises a business activity..." .

As we explain, Article 1's ban is the basis for all enforcement actions, whether they involve horizontal agreements, vertical agreements, monopolisation (abuse of dominant position), mergers, or unfair competition. Both the generality and the criminal nature of the initial ban are consistent with the view that the law was based on the United States' Sherman Antitrust Act. Chile is primarily a civil law jurisdiction.

Article 2 is an illustrative list of anticompetitive arrangements. It sets out five specific categories of "actions or agreements" covered by Article 1. The first, third, and fourth categories are standard; but the second and fifth are unusual. The categories include actions or agreements that relate to the following:

- The distribution of quotas and reduction or suspensions of production.
- Transportation.
- Trade or distribution, such as imposing quotas, allocating territories, or exclusive distribution.
- Determining prices of goods or services.
- The freedom to work, unionise, and bargain.

There is some continuing uncertainty about the legal effect of Article 2. In the early years, as Resolving Acts showed, the Prosecutor's Office and the Commissions apparently took the position that Article 2 was not merely illustrative of conduct that tends to restrain free competition, but a declaration that the listed forms of conduct are always illegal. That approach justified the condemnation of non-price vertical restraints without consideration of efficiencies or market power.

The competition institutions no longer take that approach to vertical restraints, and this has been interpreted by some as a recognition that Article 2: (a) is merely illustrative of conduct that can violate Article 1, and therefore (b) does not establish or authorise the application of a different legal standard. This argument implies that Article 2 does not authorise per se treatment of any competition law violations, including hard core cartels, resale price maintenance, and unfair competition.

Competition officials generally take the position that hard core cartels are illegal per se, basing this position on either Article 2 or on a flexible interpretation of Article 1. The argument based on Article 1 seems significantly more persuasive. The amendments proposed, as part of the pro-growth agenda, will revise the list in Article 2 to drop the two unusual items and to set forth more precise descriptions of the covered conduct. The agenda mentions:

- (a) explicit or implicit agreements or collusive practices whose object is to fix resale or buying prices, limit production, or allocate zones or quotas;
- (b) the abuse of a dominant position by an enterprise or group of enterprises with a common owner by fixing buying or selling prices, tying arrangements, allocation of markets or quotas, or other similar conducts; and
- (c) Predatory practices to gain or increase a dominant position.

The amendment appears to drop nonprice vertical restraints from the list. If Article 2 is the law's authorisation for use of the per se rule, dropping nonprice vertical restraints codifies the current practice of using rule-of-reason analysis to assess such agreements. However, the new language does not answer the important and long-running question whether Article 2 justifies subjecting the listed forms of conduct to the per se rule.

Article 1's ban applies to all individuals, to all enterprises (regardless of state ownership), and in some circumstances to government ministries or other agencies¹³.

2.3.2 The Competition Agency

Chile's current competition law – the “Law for the Defence of Free Competition” – was adopted in December of 1973.

The 1973 law created a tripartite institutional framework – an enforcement agency (the Prosecutor's Office¹⁴), a special tribunal (the Antitrust Commission¹⁵), and a number of largely advisory Preventative Commissions¹⁶ (one Central and several regional). Proposed amendments would replace -in part- the Antitrust and Preventative Commissions with an independent Antitrust Tribunal in 2004.

The Antitrust Commission (or “Resolving Commission”) is the highest body in the Chilean competition system. Its nature is that of a special court. It is not an organic part of the judiciary, but is chaired by a judge from the Supreme Court and is subject to the Court's supervision. Its other members are Chiefs of Service from the Economy and Treasury Ministries, a law school dean, and a dean of an economics department.

The Commission's main function is to decide on cases brought by either the Prosecutor's Office or private complainants. (When a case is initiated by a private complaint, the Prosecutor's Office may choose whether to participate as a party, though the

Commission can ask the Office for a report.) In addition, the Commission may (but rarely does) open an investigation on its own initiative, and it may in appropriate cases call upon police assistance in “lock-forcing” and executing search warrants. It also decides appeals concerning the Prosecutor’s information requests and the Preventative Commissions’ decisions. It has the broadest remedial powers; its remedies may involve fines, cease and desist orders, dissolving or restructuring businesses, and disqualifying individuals from holding office in professional and trade associations.

The Preventative Commissions are the most unusual element in Chile’s institutional structure. Often described as consultative organs, these Commissions were charged with answering questions and determining how individuals, firms, and government entities had to deal with activities that restrict competition.

Chilean Law No. 19.911, published on 14 November 2003, amends the prior competition law by creating a new Competition Tribunal and introducing a number of other reforms.

As proposed, the Tribunal is an independent entity that has judicial powers but is not formally part of the judiciary. It has five members. The President of the Tribunal, who must be a lawyer with at least ten years of experience in the competition law field, will be appointed by the President of the Republic from a list of five nominees established by the Supreme Court through a public contest. The other members (two lawyers and two economists) will be chosen as follows: one lawyer and one economist will be chosen by the President from a list of three nominees established by the Central Bank (Council of Governors), also through a public contest.

Other changes clarify how particular types of anticompetitive conduct should be considered and ban “unfair competition” only when the conduct is intended to gain, maintain, or increase a dominant position. The law now provides a limited “settlement” procedure. Imprisonment is eliminated as a sanction, but the amount of fines is raised, to US\$ 10 million (20 UTA). The head of the competition enforcement entity, the National Economic Prosecutor, is given new powers, including the authority to sign agreements with domestic agencies and foreign entities.

The Commission also has other, less judicial powers. Sometimes an investigation by the Prosecutor’s Office does not lead to a legal challenge, but rather to a report that discusses competitive conditions in a market and urges the Commission to propose the modification or abolition of laws or regulations that are creating competition problems. Also, in addition to issuing binding orders to entities found to have violated the law, the Commission may issue “general instructions” – binding rules that direct all members of an industry to act in particular ways in order to avoid restraining free competition.

In addition, the Antitrust Commission currently plays a role in determining when the normal competition rules do not apply, though the new law proposes to abolish this system. A “well-founded positive report” by the Antitrust Commission is required before the state may confer a monopoly on a private party or authorise a conduct prohibited by the competition law.

2.3.3 Some Preliminary Conclusions about the Competition Authority in Chile

The competition institutions' cautious approach seems to have helped facilitate the gradual acceptance of competition enforcement. But the tradition of caution, including an apparent reluctance to find violations and to impose fines, has in part reflected a view in Chile that economic offences against the public are not serious and that the costs of monopoly may not exceed the costs of competition law enforcement.

In order to improve decisions, it is necessary to clarify legal standards introducing guidelines or policy statements. There is much uncertainty on basic issues such as the means of defining markets, evaluating dominance or market power, assessing the legality of a vertical restraint, and even the standard applicable to cartels.

Chile's very broad ban on acts or agreements that attempt to restrain free competition provides a sufficient basis for a full range of competition enforcement. A significant number of basic substantive issues appear to be unresolved. In the early years, agreements within the categories of Article 2 were essentially illegal per se. Through time, there has been an increasing use of economic principles, which meant moving away from rules per se to the rule of reason. However, simultaneous to this process, much uncertainty has been introduced in terms of the decisions taken.

At the same time, competition policy has had an increasing role in the regulation of public utility services; the telecommunications and electricity sectors for example, are not authorised to set tariffs unless the Commission has found the market to be competitive. A Commission ruling that local telephony services were not competitive laid out six provisions aimed at creating a genuinely competitive market.

On the other hand, mergers have evidently got increased attention in the last few years. Competition officials observe that in Chile's very open economy there are few anticompetitive mergers and that in recent years, at least, the potentially problematic mergers have been reviewed. Some of Chile's most important recent merger cases have involved acquisitions of firms operating in infrastructure sectors such as telecommunications and electricity. The cases constitute an important part of Chile's overall regulatory approach to those markets. Until recently, however, it appears that Chile has never had a significant merger control program except in infrastructure industries..

3. PARTIAL PRODUCTIVITY INDEXES FOR MEASURING THE EFFECTIVENESS OF COMPETITION POLICY

The objective of this section is to develop some partial productivity indexes that capture the effectiveness of the antitrust agencies to enforce the competition law and allow us to compare between the different agencies considered. The evaluation of competition policy has been based on qualitative analysis and not much has been done on the estimation or quantification of the effectiveness in the enforcement of the competition law.

However, in this section we concentrate on developing some measures of the efficiency of the Agencies considered and thus, we start by constructing partial productivity indexes. We are conscious that in any case the analysis is partial and only focus on some but not all the important factors. The objective is to develop some indexes in order to compare and

contrast the different agencies considered. We are aware of the caveats of this approach: it is biased and dependent on the particular ratios that we construct and analyse. Furthermore, the paper does not aim at proving a broad assessment of the role and effectiveness of competition policy in each of the countries. This would require considering a general equilibrium analysis, which exceeds the scope of the present paper. Additionally, it would require to take into account other important dimensions of the country that might affect the development of the competition policy.

Therefore, we just concentrate on developing some indexes that allow us to compare quantitatively between agencies. We complement the analysis with the construction of technological frontiers. We believe that the methodology provides an interesting approach that aims at improving the quantitative analysis on competition issues and increasing the information a regulator or a policy maker should rely on in order to assess and strengthen the role of competition policy. We will also discuss further extensions to the present methodology that might enrich the analysis.

Performance indicators can be separated into two main categories: I) productivity indicators and ii) frontier estimates. Partial productivity indexes require to define some outputs “produced” by each agency.

The first point to highlight concerns the definition of efficiency. Efficiency is defined as the capacity, in this case of the Competition Agency, to obtain the maximum product at the minimum costs. It includes two aspects: productive and technical efficiency and it deals with the input requirements and the allocation of resources.

As already mentioned, the present approach involves defining some measure of the product or output generated by the Competition Agency and evaluating the use of resources to develop its activities. We define some outputs such as the number of procedures finished per year, the number of procedures with a resolution per year, the number of sanctions imposed per year. However, it might happen that considering only this information would provide a biased assessment of the importance and magnitude of these figures. That is the reason why we proceed to scale them by factors like the number of procedures initiated each year or the number of employees. Doing that, implicitly, we are providing information about the level of efficiency to develop each Agencies’ tasks. However, it must be properly set that this analysis is partial and the selection of the indexes is arbitrary and thus, subjective.

In this context, it is also important to distinguish the activities or functions each Agency performs. Each Competition Authority deals with conduct cases and, when appropriate, merger control. Therefore, we present some alternatives of partial productivity indexes distinguishing conduct cases and mergers.

To start with, we present the evolution of conduct cases of each Agency per year. As it is shown, the evolution is quite dissimilar between Agencies. We distinguish between the number of cases solved, the number of cases where fines were imposed, the evolution of cases that were considered non problematic in terms of their effect on competition.¹⁷ In the case of Chile, the number of procedures that were conditioned at any form includes decisions like cease of conducts, agreement between parties, etc. In this last case, the data has been estimated through a detailed search in internet; thus, it is an approximation of the total number of cases.

Table 1: Evolution of number of conduct cases: 1990-2003

		90- 95	1996	1997	1998	1999	2000	2001	2002	2003
Argentina *	Solved	23	8	24	32	17	15	20	32	39
	Fined	7	2	3	3	3	2	3	2	4
	Desestimation	13	12	13	26	13	12	17	30	34
	Agreement	3	1	1	3	1	1	0	0	1
Perú **	Solved	53 ´	14	17	9	6	3	8	12	8
	Fined	18 ´	5	6	3	2	1	3	4	3
	Desestimation	35 ´	9	11	6	4	2	5	8	5
Chile	Solved	245	40	31	31	35	51	47	40	40
	Fined	136	3	0	3	1	2	3	2	2
	Desestimation	98	16	12	12	14	20	19	16	16
	Conditionned	11	21	19	16	20	29	25	22	22

Notes: *The total number of conduct cases were only defined by the National Commission for Competition Defense for leading cases. ** Resolution of cases by “Commission of Free Competition”. (´) Years 1993 to 1995.

Source: own elaboration.

From the table below, it is worth to emphasize the following points:

- In Argentina during the first years, there was a small number of leading cases solved. The Competition Commission increased the number of procedures finished per year through time, but not with a constant pattern.
- Chile has a better performance in terms of the number of procedures initiated each year relative to the set of countries considered. What remains to be answered is the real significance of cases solved.
- Perú has the highest proportion of fines to total cases solved through the period.

From the information gathered, it is worth to provide some indexes in order to compare the performance of each Agency. To do this, we present the following relationships:

- number of cases to total budget of each Agency,
- budget per employee
- number of cases solved per employee during a year and
- number of fines to total cases solved during a year

The information is provided for the year 2002.

The Argentinean and Chilean agencies can be described as small agencies in terms of personnel. However, in terms of budget, the Chilean agency is proportionately bigger than its Argentinean counterpart¹⁸. This is confirmed by the index budget per employee. Regarding Perú, it is important to emphasize that the number of employee and budget includes not only the Competition Tribunal but also the rest of Tribunals. Therefore, in this sense they are not comparable. The lack of a proper disclosure of the data also raises a derived concern about the effectiveness of the Agency to fulfil its functions and, the lack of transparency and a clear separation of functions.

With all the previous comments in mind, and considering only the information of “cases solved to budget” and “cases solved per employee” one can assess that the Argentinean Agency is relatively more efficient to finish a determined number of cases with the resources given, personnel and budget. However, the last assertion is incomplete, due to the fact that we are considering only two indexes to assess the relative efficiency of each Agency.

Table 7.2: Selected indexes. 2002

Year	Personnel	Budget (1)	Cases solved	Cases solved/ Budget	Budget per employee	Cases solved per employee	Fines to total cases
Argentina	42	830	32	3.9	20	0.76	0.06
Perú	268*	9094*	12	N/d	34	N/d	0.33
Chile **	54	2224	47	2.1	41	0.87	0.05

Notes: (1) Expressed in thousand of U\$\$. * It includes all the Tribunals. It is not possible to provide the information only for the Tribunal of Competition. ** Information for 2001

Source: own elaboration.

As mentioned, in the case of Perú, the figures of employee and budget include not only the Competition Tribunal but also the rest of Tribunals. This must be properly taken into account in order to interpret the results obtained. Regarding the data of cases solved, on the contrary, we present in Table 7.2, only the number of cases of anticompetitive matters. In order to address this issue, in the following table we present the same information of the table below, but with a modification in the number of cases solved. The aim is to get a better assessment, if possible, of the level of efficiency of the agency, considering different alternatives about the segmentation of functions. The first alternative is to consider the total number of cases of all the Tribunals instead of the ones corresponding only to Competition. Table 7.3 includes the total number of cases of INDECOPI, which amounts to 302 cases solved for 2002.

Table 7.3. Selected index I. 2002

Year	Personnel	Budget (1)	Cases solved	Cases solved/ Budget	Budget per employee	Cases solved per employee	Fines to total cases
Argentina	42	830	32	3.9	20	0.76	0.06
Perú	268*	9094*	302*	3.3	34	1.12	0.33
Chile **	54	2224	47	2.1	41	0.87	0.06

Notes: (1) Expressed in thousand of U\$\$. * It includes all the Tribunals. It is not possible to provide the information only for the Tribunal of Competition. ** Information for 2001

Source: own elaboration.

In this context, the figure of cases solved per employee amounts to 1.12¹⁹. Compared to the other agencies, it seems that the Agency of Perú is relatively more efficient measured by the number of cases per employee. However, it is including other varied topics, not related to competition issues and thus it remains to be analysed the real impact of the Agency's work on the different markets. Regarding the ratio of cases solved to budget in this scenario, Argentina continues to show a better performance relative to the other two agencies.

Another possibility is to estimate the number of employee dealing with competition issues by the simple proportion of the Tribunal of Competition on the total number of tribunals that INDECOPI gather (1/6). If this is the case, then the number of cases solved per employee amounts to 0.26. This has evidently another implication in terms of the relative efficiency of Perú compared with the performance of the other Agencies. Regarding Cases solved to budget, we can follow the same approach to estimate the corresponding budget of competition issues (16% of 9094). With this information, the ratio of cases solved to budget amounts to 0.6. If this is the case, Perú has the worst performance in terms of the resources used to finish a number of procedures given.

In any case, having in mind the drawbacks and limitations of the information considered allow us to emphasize the importance of adequate data sets in order to make comparisons and increase the information that policy makers have to take their decisions.

In order to assess the relative efficiency of each Agency, we finally consider the information of fines to total cases solved. From this information, it seems that Perú tends to impose considerably more sanctions than the rest of the agencies under analysis. However, nothing is said about the real impact that these fines have on markets. In fact, this is one of the basic features of the Peruvian agency.

In the following Table, we present the distribution of conduct cases for the three countries.

Table 7.4. Distribution of conduct cases

Conduct	Argentina *	%	Chile **	%	Perú***	%
Horizontal Arrangements	30	18%	35	10%	51	4%
Vertical Arrangements	21	13%	143	41%	53	4%
Other Monopoly Conducts	73	43%	73	21%	24	2%
Mergers	29	17%	13	4%	11	1%
Unfair Competition	15	9%	88	25%	1.130	89%
Total Cases	168	100%	352	100%	1.269	100%

Notes: * Years 1990 to 2001. **Years 1996 to 2004. ***Years 1993 to 2003.

Source: own elaboration (See explanations in the Annex).

Comparing the figures below, it seems that Perú tend to specialize in the resolution of cases regarding unfair competition, while Chile concentrate mostly of its resources on vertical arrangements. Regarding Argentina, the distribution of conduct cases appears to show a greater variety.

The following table shows the evolution of merger cases for the period of reference.

Table 7.5. Evolution of number of merger cases: 1990-2003

		90-95	1996	1997	1998	1999	2000	2001	2002	2003
Argentina	Total	0	0	0	0	39	156	37	26	29
	Denied	0	0	0	0	0	1	0	1	1
	Conditionned	0	0	0	0	1	6	0	1	32
	Authorized	0	0	0	0	37	150	37	24	31
Perú *	Total	0	0	0	0	1	0	0	0	0
	Denied	0	0	0	0	0	0	0	0	0
	Conditionned	0	0	0	0	1	0	0	0	0
	Authorized	0	0	0	0	0	0	0	0	0
Chile	Total	7	0	1	7	1	0	0	2	2
	Denied	1	0	0	3	0	0	0	0	0
	Conditionned	1	0	0	1	0	0	0	2	0
	Authorized	5	0	1	3	1	0	0	0	2

Notes: * It includes only one merger in Electrical Sector.

Source: own elaboration.

The first point to highlight is that relative to the set of countries considered, it seems that Argentina is the one that mostly conducts merger control. The Amendment of the Law in 1999 gave attribution to the Tribunal of Competition to conduct ex ante merger control as a preventive tool in the fight against cartels. As it can be seen, since then there had been a major increase in the number of mergers analysed. However, some legal innovations were introduced since 2001 in the Argentinean legal system, which implied, among other things, an increase in the thresholds for operations to notify. This more strict requirement explained the relative reduction in the number of mergers controlled of the last years. In any case, as we will discuss in the following paragraphs, it seems that on average, Argentina's merger control policy has had more significant impact on markets. This is particularly true if we compare it with the rest of the Agencies considered.

Perú's legal system does not have ex ante merger control, with the exception of the electricity sector. The lack of a uniform policy between sectors is another caveat of the system and at the same time raises a concern regarding the effectiveness of the Antitrust Agency to enforce the competition law. In the case of Chile, the Antitrust Agency is allowed to control mergers. However, the evidence considered seems to indicate that the impact on markets is not so significant.

Having analysed both conduct cases and mergers, it is important to emphasize that the former analysis is biased. Therefore, it is worth to complement it with another approach in order to shed more light on the main features that characterize each Agency. This second approach consist of further analysing some of the main cases that each agency has dealt with during the period of reference. Analysing the most significant cases will allow us to derive some conclusions regarding the scope and the impact that each agency's decisions has variables on markets. Additionally, it also contributes to assess the effectiveness of each agency on conducting its functions.

In order to measure this effectiveness, we analyse the main cases where each Competition Agency imposed sanctions for the period 1996 to 2004. To do this, we construct two indexes, distinguishing between Antitrust Resolutions (Horizontal arrangements, Vertical arrangements, Dominance and Unfair Competition) and Merger Resolutions.

Table 7.6. First Three Conduct Fined Cases. 1996 - 2004 .

Country	Company	Economic Sector	Conduct	Fine (US\$ Million)	Fine (US\$)/ Gross Technical Profits	Fine (US\$)/ Maximum Fine
Argentina	YPF S.A –REPSOL	Gas and Oil	Abuse of dominant position	109,644	6%	100%
	Tele Red Imagen S.A. (TRISA), Televisión Satelital Codificada S.A. (TSCSA)	TV transmission	Abuse of dominant position. Price discrimination.	1,059	N/a	80%
	YPFS.A. -REPSOL	Gas and Oil	Abuse of dominant position.	120	Insignificant	Insignificant
Chile	CTC Comunicaciones Móviles Startel S.A.	Telecommunications	Dominance Predation Prices	514	1%	100%
	Lan Chile Airlines S.A.	Airline	Price Agreements	328	Insignificant	60%
	Falabella S.A.C.I.	Supermarket Chain Trade Retailer	Barriers to Entry	257	1%	1.3%
Perú	Asociacion Perúana de Avicultura and 20 companies	Poultry Farming	Dominance Predation Prices	6,085	N/a	30%
	KLM, Lufthansa e Iberia	Airlines	Barriers to Entry	149	N/a	5.5%
	El Pacífico Perúano, Suiza Compañía de Seguros, etc.	Insurance Companies	Price Agreements	72	44%	3%

Notes: * In Argentina maximum fine imposed varies between US\$ 150.000.000 and US\$ 10.000 (Law 25.156 and 22.262). ** In Chile maximum fine imposed was about 10.000 UTM (approximately US\$ 500.000). In 2004 Maximum fine imposed increased to 20.000 UTA (approximately US\$ 10 million). ***In Perú fines were calculated in base on Resolutions of “Free Competition Commission”. In all cases Gross Technical Profits were informed by each country Stock Change.

Source: own elaboration.

As seen in Table 7.6, the total amount of fines is very heterogeneous between countries because, in part, competition institutions and legal systems are very dissimilar. In Argentina these fines represented - for the three first leading cases- US\$ 110.823 million, in Chile penalties were about US\$ 1.100 million, and in Perú about US\$ 6.300 million.

These fines were imposed to leading companies in each country because of anticompetitive practices, including agreements and abuses of dominant position, and they are an indication of relevance and impact of decisions taken by the Commissions in competitive matters.

In Argentina they involved important economic sectors. For example in 2000 -first case that appear in Table 7.6- the Commission recommended to impose a fine of US\$ 109.6 million to YPF-REPSOL S.A, which is the leading oil and gas Company. The defendant was found responsible of abusing its dominant position in GLP market -Propane Gas-²⁰ and artificially increasing their prices.

Relative to the set of countries analyzed, competition institutions in Chile have an active role in infrastructure and services sectors. As we show in Table 7.6, the Antitrust Commission found CTC S.A.-Telecom Company²¹- guilty of fixing predatory prices and imposed a sanction of US\$ 514,000. Additionally, in the air transport sector, the Resolving Commission found that Lan Chile Airlines S.A. had sought to drive a new competitor out of the market by predatorily lowering its prices on the one route on which it competed with the new entrant, and imposed a fine of US\$ 328,000.

In Perú from 1993 to 2003, out of the one hundred and thirty proceedings²², only one resulted in a significant penalty of US\$ 6.085 million in the market of poultry farming. It was an isolated case considering the Peruvian jurisprudence. The conduct sanctioned was an agreement of prices among poultry producers during 1996. In addition to imposing a fine, in all the mentioned cases there were also injunctions involved, in order to restore competitive conditions.

In order to assess the effectiveness and impact of Competition law enforcement we consider two indexes: the ratio of fines to technical profits earned by each company fined, and the share each fine has on the maximum penalty available -shown in the previous table-

Considering the first of these ratios, there is a wide variety and severity in the amount of fines imposed. It should be noted that as a result of the investigation, the economic impact of these penalties differ among countries and companies. This variety in the degree of indicators give evidence to the lack of a clear pattern of competition goals during the '90s. As it was shown, the number and the amount of fines tend to confirm the apparent reluctance of Chile's and Perú's competition agencies and legal system to impose sanctions.

In Chile, the Prosecutor's Office is allowed to impose criminal sanctions for violations of the competition law, but this does not occur in practice. The maximum fine was approximately US\$ 230,000, but fines are rare and seldom reach this maximum. In fact, during 30 years of competition enforcement, fines have been imposed in only 73 cases. Since 2004, there were some amendments to the legal framework -Chile's Law N° 19.911 amends the prior competition law- such as:

- creation of a new Antitrust Tribunal -Competition Tribunal-, and
- imposition of fines up to an amount equivalent to twenty thousand "annual tax units" to be paid for the benefit of the Treasury (approximately US\$ 10 million).

It is also important to analyze conduct fines compared to the maximum penalties available within the legal system. In this sense, Argentina imposed on average fines that were approximately 60% of the maximum amount, Chile 54%, while Perú presents the worst performance with 13%.

In order to compare data from the three Agencies, we calculate an Index for conduct fined cases²³ -ICFC- in each country. These statistics are based on the information of fines to gross technical profits and fines to maximum fine. The aim is to assess the ability of the Agencies to enforce competition law in the markets during the period of reference and compare between them.

Furthermore, we measure the impact of each agency's decision by the numerical value of the index. As a consequence, the higher the index number, the better the performance.

Table 7.7. Index of Conduct Fined Cases (ICFC). 1996 – 2004

ICFC	Argentina	Chile	Perú
1996-2004	93%	82%	42%

Source: own elaboration.

A comparison between countries seems to suggest that the performance of Argentina and Chile is better than Perú. The main difference between the first two is that Chile tends to impose less significant sanctions, while Argentina tends to impose high-impact fines in leading cases.

However, in addition to the results shown by the former Index, it might be interesting to consider a complementary dimension regarding the importance that each agency has in the regulatory and legal framework. In this sense, during the '90s the Chilean agency had considerable influence on public utilities, on monopoly regulations and on policy issues. In the same way, Perú's Commission played a prominent role in litigations among market players or customers, as well as between municipalities and public bodies. Regarding Argentina, the role of the competition agency has varied through time, much influenced by the cycle and the political agenda.

To conclude, the process of Competition Law implementation has not been homogeneous among countries during the '90s. Chile and Perú seem to have had a more active role on regulatory issues, than in the design of effective sanction systems, like the introduction of investigative tools or the more precise definition of sanctions. On the other hand, Argentina efficiently imposed sanctions in a limited set of cases, but probably with a higher impact. This can be related to the former argument of the existence of asymmetries between sectors.

Competition policy should be transversal to all sectors of the economy while regulation should be specific to each sector. However, due to the deficiencies of the legal systems considered, there are many cases that contradict the former principle and thus, it reduces the efficiency of the agencies to enforce the law.

We proceed to follow the same analysis for merger control. In order to measure this effectiveness, we analyse the main cases of merger control conducted by each Competition Agency for the period 1996 to 2004. We also present the information of the results of the procedures.

Table 7.8. Main Merger Operations. 1996 – 2004

Country	Company	Result
Argentina	Correo Argentino S.A. (CASA) and Sociedad Anónima Organización Coordinadora Argentina (OCA)	Merger – Negative
	LAPA's acquisition by Aeropuertos Argentina -AA- 2000	Merger – Negative
	Ambev (Brahma)- Quilmas	Merger Conditional
Chile	CTC Comunicaciones Móviles Startel S.A. and VTR S.A.	Merger – Negative
	Enersis S.A. and Endesa Chile	Merger Conditional
	Banco Santander Hispano and BSCH	Merger Conditional
Perú	Eléctrica Cabo Blanco SA, Generadores Perú SA, Generalima SA, Inversiones Distrilima S.A .	Merger Conditional

Source: own elaboration.

The legal framework varies significantly between these countries, not only in legal terms but in the economic consideration about whether mergers would generate efficiencies in the economy. Consequently, in order to analyse mergers or acquisitions we should consider that:

- i. The Antitrust Law in Perú does not include merger control. The Competition Law focuses on firm conduct but not the structure of the industries. However, there is one exception, which is the electricity sector;
- ii. Regarding mergers in Argentina, in 1999 new legislation introduced ex ante review and authorization of mergers and acquisitions and gave the competition authority full jurisdiction on competition issues in every sector of the economy.

In Argentina two mergers were denied by The Competition Commission and had considerable impact; they were: Correo Argentino S.A. – OCA S.A. (postal services market) and LAPA S.A. - Aeropuertos Argentina 2000 (air transportation and airport management). In Chile only one case was denied (in the telecommunications sector).

A point to highlight is that liberalization of the economy together with the privatisation process (electricity, telecommunications, transport and other infrastructure) during the nineties, seem to have generated new challenges in the Agencies' merger-related tasks. In this sense, Chile and Perú participated in the Enersis S.A. and Endesa S.A. merger process. As a consequence the competition institutions began playing a more active role in some infrastructure sectors, even though legal framework does not include merger control. This raises a concern about the asymmetries within each of the legal frameworks, which

definitely impact on the effectiveness of each Agency on the enforcement of the Competition Law.

Table 7.9. Index Merger Cases (IMC). 1996 - 2004.

IMC	Argentina	Chile	Perú
1996-2004	83%	67%	17%

Source: own elaboration.

4. EMPIRICAL ESTIMATION OF THE EFFECTIVENESS OF ANTITRUST ENFORCEMENT

In this section, we proceed to estimate the relationship, if any, between the different models of competition agencies and their enforcement capacities, as well as their impact on the market. The aim is to assess whether there is any statistical relationship between the taxonomy of Agencies and their effectiveness in the improvement of the competitive environment. In section two, we have analyzed the main attributes of each competition framework and we highlighted some dimensions that made all of them comparable. These dimensions are taken into account for the estimation.

Performance indicators can be separated into two main categories: i) productivity indicators and ii) frontier estimates. We have presented in the last section some partial productivity indexes, which require to define some outputs “produced” by each agency. One of the main conclusions derived was that on average and based on the information provided by those indexes, Argentina show a better performance in mostly of the dimensions considered.

In this section we proceed to evaluate the use of resources and the significance that structural and environmental variables have on the output of each Agency. The aim is to assess whether the conclusions of the previous section are confirmed on average when considering a broader analysis which is the estimation of a production frontier of the Competition Agency. It must be repeated that the present analysis has many drawbacks, such as data limitations; therefore the analysis is just illustrative and it aims at providing a quantitative dimension to the performance evaluation of an institution like a competition agency.

As mentioned, through the 90s, with the introduction of yardstick competition for the regulation of natural monopolies, there has been an increasingly interest in developing standardised performance indicators. ²⁴This indicators have been used by regulators to assess the absolute and relative performance of regulated utilities ²⁵. In this context, one of the main instruments to measure the efficiency of a firm or an institution in general is the efficiency frontier. Efficiency measures were originally introduced by Farrell (1957). In the following paragraphs we succinctly discuss the main features of the efficiency frontier

literature in order to provide the basic guidelines to understand and interpret the results presented in this paper.

Technological frontier studies can be classified according to the specification and estimation methodologies. Focusing on specification, the problem can be viewed from two different approaches: the production function and the cost function. The production function shows the output as a function of inputs, while the cost function shows the total cost of production as a function of output and input's prices. In particular, we construct a production function. In this selection, there is another implicit choice, regarding the type of efficiency to estimate.

There are basically two possibilities: theoretically defined production function (based on engineering knowledge of the process of the industry) and an empirical function constructed on estimates based on observed data. The usual practice for regulatory purposes is to analyse individual performance in relation with best-observed practice rather than comparing with an ideal practice (which is generally unobtainable). In this work, we will consider that the efficient production function is represented by the best-observed practice among the firms in the sample.

Regarding the alternative estimation methods, both production and cost functions estimates can be obtained using statistical or mathematical programming methods.²⁶

Once a decision is made on which type of frontier, costs or production, is going to be estimated, and which technique, statistical or mathematical programming, is to be used, the following step is to decide on whether a deterministic or stochastic frontier is to be used. If a deterministic approach is chosen, all observed difference between a particular firm and the frontier is attributed to inefficiency, ignoring the possibility that the performance of a firm might be affected not only by its own efficiency but also by factors beyond its control (such as adverse climate conditions).²⁷

The deterministic frontier production function model with panel data is written as

$$Y_{it} = \beta_0 + X'_{it} \beta + \varepsilon_{it},$$

where Y_{it} is the output of decision making unit (DMU, hereafter) i ($i=1, 2, \dots, N$) at time t ($t=1, 2, \dots, T$), X_{it} is the corresponding matrix of k inputs and β is a $k \times 1$ vector of unknown parameters to be estimated. The error term is specified as ε_{it} Technical efficiency accounts for those factors that can be controlled by the DMU, and can be defined as the discrepancy between a DMU's actual output and its potential output. The level of technical efficiency of DMU i in period t is obtained as

$$EF_{it} = \exp(-\varepsilon_{it}).$$

The measure of productive efficiency adopts values between zero and one, with one denoting a firm that is 100% efficient. These measures are defined under the assumption that the production frontier or efficient production function is known.

We apply this approach to measure and compare the performance of the antitrust agencies. We are implicitly assuming that the approach conducted by regulators when

analyzing the performance of regulated firms can be replicated to compare the performance of public agencies.

The approach consists of constructing a frontier and evaluating the efficiency of each institution as the distance from the observed practice to that empirical frontier formed by the best practice. We are focusing on relative efficiency, based on the data set used for the estimation. As already mentioned, we are analyzing the performance of three agencies: Argentina, Chile and Perú, for eight years (1996-2003). There are some alternatives regarding the way to treat the data: one possibility is to consider each year separately, estimate cross section sets and then evaluate the rate of variation of the scores between years and through the different agencies. Another possibility is to consider each observation independently, construct a panel set with all the observations and estimate the efficiency score of each agency for each year as the distance between the observed practice to the one that builds the frontier, given a particular environment. The advantage of this last approach is that considering all the information together in a panel set, we increase the efficiency of the coefficients estimated. In fact, this is the approach that we follow in the present paper.

Therefore in this paper, we try to elaborate upon the applied aspects of the efficiency measurement in a competition context. We estimate the efficiency of each Agency based on a production function. A production function relates the maximum amount of output that can be obtained, given some resources. To measure the efficiency of them, we apply econometric techniques. We suppose that the level of efficiency is constant through the period of reference. Thus, we obtain one efficiency score for each of the agencies considered for the whole set of years. Additionally, we discuss and consider the role of the environment in the development of each agency, and therefore in the level of efficiency at which they operate. In particular, we analyze the role of the legal framework in the level of efficiency.

The first step is to discuss the possible alternatives for outputs generated by the Agency. Secondly, we discuss which are the factors that help to control and contribute to explain the variability of it. Finally, we show the results of the estimations and we present the conclusions.

4.1 Dependent Variable

As dependent variable, there were some alternatives due to data availability. We consider the total number of procedures finished by each agency per year, including conduct cases and mergers. We do not distinguish between conduct cases and mergers. There might be some alternatives for output definition. However, the availability of data and also the quality of the data considered explain in part the selection of the variables. We also try the total number of fines (including sanctions and some kind of conditioning) imposed by each agency per year.

4.2 Variables of control

The paper relates these indexes to the requirement of resources and environmental factors such as:

- Size of the Agency. It is measured by the evolution of the number of employers each Agency has. Additionally, we consider the yearly budget assigned to each agency to develop competition policy.
- Size of the economy. One alternative to this is the real GDP of the current period or the variation of GDP in order to capture the influence of the business cycle
- Faculties of the Agencies. We include two dummy variables to capture whether the agency control mergers or not (named as d1 with d1= 1 if there is ex ante merger control) and whether the Agency has enforcement powers in all the sectors of the economy (named as d2)

Size of the economy and faculties of the Agencies are defined as environmental variables. We include this variables in order to capture the fact that there are some factors that each agency does not fully control but affect their performance.

Starting with an over parameterized model, the methodology was to follow a stepwise procedure in order to reach a final specification that fulfills desirable statistical properties, including parsimonious.

A production function was constructed in order to measure the performance of each agency. In the case of the Competition Agencies, we define output as the total amount of cases solved. Regarding inputs, we finally include the number of employee in each agency. In the following table, we present the results of the estimations of the model selected.

We try other specifications, through which we include variables such as the yearly budget. However, the budget was not significant to explain the variability of the total number of cases solved among agencies.²⁸

In the final specification, we include as environmental variable d1 in order to capture merger control. We also consider d2 and the evolution of GDP. This last variables is not significant to explain the variability of total cases. Regarding the first two variables, including d2 instead of d1 does not significantly alter the results and the main conclusions derived.

The following table show the specification of the basic model and the results of the estimations. We estimate a fixed effect panel data for the whole period. We also try a random effect model²⁹. However, the results of the former were better.

Table 7.10. Production function. Fixed Effect model I. Panel

ln(cases)	Coef.	Std.	Err.	Z
ln(emp)	1.73	0.38	4.52	0.00
_cons	-4.19	1.63	-2.56	0.02
sigma_u	29.13			
sigma_e	0.46			

Notes: R-sq: within = 0.5608
between = 0.9986
overall = 0.3751

Obs per group: min = 5
avg = 6.7
max = 7

Source: own elaboration.

In this specification, we are considering one product and only one input (labor intensive production function). The main feature of the former estimation are the following:

- Personnel is significant to explain the variability of total cases. The sign of the coefficient is the one expected by the theory
- The model has an adequate global adjustment
- As all the variables are expressed in logarithm, the coefficients have the interpretation of elasticity.
- We try other specification of dependent variable, the evolution of number of fines imposed, but the global adjustment does not improve.

Table 7.11. Production function. Fixed Effect model II. Panel

ln(cases)	Coef.	Std.	Err.	T
ln(emp)	1.22	0.50	2.43	0.03
d1	0.67	0.44	1.51	0.15
_cons	-2.33	2.00	-1.16	0.26
sigma_u	2.02			
sigma_e	0.44			

Notes: R-sq: within=0.6188
between= 0.971
overall= 0.199

Obs per group min=5
avg=6.7
max=8

Source: own elaboration.

In the following table we present a variation to the basic model where we include d1 as another regressor. The former conclusions maintain:

- The global adjustment is adequate.
- Even though the value of the coefficient vary, the efficiency scores and the ranking between agencies derived from this specification do not significantly change. Stability of coefficients and of the efficiency scores is highly desirable as a property and thus reinforces the robustness of the results of the model selected.

Having described the specifications and the estimation results of the basic model and its alternative, in the following table we present the mean of the efficiency scores derived from the production functions commented. One point to highlight is that the mean of both models are comparable and quite similar. The standard deviation is also relatively similar

between them. To repeat, this property is highly desirable and thus reinforces the robustness of the results of the model selected. Additionally, in Table 7.13 we present the efficiency scores for each of the agencies considered and the ranking between them for both models.

Table 7.12. Efficiency scores for the selected model

Scores	Obs	Mean	Std. Dev
Model 1	20	0.57	0.44
Model 2	20	0.55	0.43

Source: own elaboration

Table 7.13. Efficiency scores and rankings

Agency	Model 1		Model 2	
	Score	Ranking	Score	Ranking
Argentina	1	1	1	1
Chile	0.02	2	0.05	2
Perú	0.66	3	0.57	3

Source: own elaboration

As mentioned, a score of 1 is interpreted as a 100% efficient agency, given the set of antitrust agencies considered. However, it is important to emphasize that the conclusion derived that in both models, the Argentinean agency is the relatively more efficient one is particular to the sample consider. Frontier estimation is sensible to the number of observations and furthermore to the quality of the data used to conduct the analysis. In other words, it is very sensible to the presence of outliers and badly measured variables. Thus, all the discussion about data availability, data deficiencies and the assumptions made to obtain each figure are particularly relevant in this point and therefore, they are more than relevant when deriving the conclusions.

Additionally, we evaluate some indicators of efficiency. In this case, we consider solved investigations to presented investigations during a year. We aim at analyzing which factors contribute to explain the variability of the ratio of sanctions to total cases. In this case, we estimate a random effect model for the period. In addition, a fixed effect model was estimated. The Hausman test was performed to prove the consistency of the fixed effect model coefficients compared with random effect ones. At a 5% level of significance, the hypothesis that the coefficients of fixed effect model are equal to the ones of random effect model could be rejected, providing evidence in favor of the random effect model. The following table show the results of the estimation.

Table 7.14. Impact of agencies. Random effect model. Panel

ln(sanc/cases)	Coef.	Std.	Err.	z
ln(emp)	0.84	0.19	4.31	0.00
_cons	-8.84	1.60	-5.54	0.00
sigma_u	0.00			
sigma_e	0.61			

Notes: R-sq: within = 0.0486
between = 0.9999
overall = 0.5075

Obs per group: min = 6
avg = 6.7
max = 7

Source: own elaboration.

The methodology provides an interesting approach that aims at improving the quantitative analysis on competition issues and increasing the information a regulator or a policy maker should rely on in order to assess and strengthen the role of competition policy.

However, one caveat of this approach is the fact that we are only considering data at the national level, with the limitations it has in terms of the conclusions. Sectoral information will significantly enrich the analysis, allowing to distinguish the impact competition policy has on each sector.

Finally, we consider further extensions for the evaluation of the relative efficiency between antitrust agencies discusses through the present paper. They are the following:

- Variation of the interest rates.
- National average import tariffs. In this case, the objective is to analyze the role imports have on the competitive environment of each market. Imports increase the supply of goods, tend to reduce prices and might potentially reduce the level of concentration in the markets. This is an environmental factor that might affect the role and impact of any competition Agency. However, considering only tariffs might provide a partial view of the degree of openness of the economy. Therefore, other alternatives are considered as the trade openness index.
- If enough data is available, one extension might be to allow that the efficiency scores vary through time in order to capture the possibility that the frontier move or even, that the relative efficiency of the agencies change, reflecting catching up effects.

5. CONCLUSIONS

During the 90's, a large group of regulations were eliminated in Latin America, fostering economic competition criteria and market transparency, leaving in the participants' hands the freedom to achieve dynamic equilibrium in these markets.

As a result, competition institutions in Argentina, Chile and Perú have been active but with different level of success in competition advocacy concerning: the abuse of dominant positions, vertical arrangements and infrastructure industry monopolies. The effects were not extensive and systematic enough to maximise and guarantee competition in all markets.

Related to the large investment process a wide range of industries became more proactive and aggressive in challenging all forms of conducts -merger, monopolisation, cartels-, and Competition Law probably did not adapt quickly enough to the new economic structure.

In fact, if we analyse all case resolutions by the Commissions in each country, we realize that in the leading cases where fines were imposed, most seem to have been more a consequence of erratic decisions made by a government and the agencies than a result of a systematic effort in the fight against cartels. It is furthermore important to point out that on average the three countries considered have only 18% conduct fined cases over total cases from 1996 to 2002.

If we analyse Antitrust Resolutions during the nineties, it seems that the process of Competition Law implementation has not been homogeneous among countries with respect to the significance and the impact of fines imposed on different companies and sectors as well as the legal framework. In this sense, some Commissions have different abilities in order to design regulatory tasks in infrastructure sectors.

During the 90s, there has been an extended process of amendments to the legal frameworks. The majority of them aims at increasing the capacity of each competition agency to enforce the law, such as the creation of the Tribunal of Competition both in Argentina and in Chile (Law N° 25156 in the first case and Law N° 19911, 2003), the derogation of competition attributes in other institutions, the introduction of new investigative tools, the more clear definition of responsibilities in competition matters to the agencies. However, some other changes in the legal framework went in the opposite directions, in terms of their enforcement capacities, such as the modifications since 2001 in Argentina's thresholds (already mentioned). In any case, in the three countries, there are much more space to further reforms to increase the effect of competition on markets, like the introduction of leniency programs, advocacy faculties and independence condition.

Regarding merger control, the differences among agencies are significant. Argentina, since 1999 and Chile conduct ex ante merger controls. On the contrary, and with the exception of one sector (electricity) the competition authority does not control merger operations. In this case, vertical or horizontal mergers has to be subject to a prior permission procedure in order to avoid acts of concentration that tends to diminish, lessen, damage or prevent competition.

Concerning autonomy, in both Perú and Argentina, the Competition Agencies emit non binding resolutions to the Secretariat, from which they depend³⁰. This reduces the effectiveness of the decisions taken. In the case of Chile, Law No. 19.911 (2003) amended the prior competition law by creating a new Competition Tribunal as an independent entity with judicial powers. The decisions taken by the Tribunal are appealed to the Supreme Court.

Another point regards the role of Antitrust Law. Competition policy should be transversal to all sectors of the economy while regulation should be specific to each sector. This economic principle tend to maximise the efficiency of the agencies to enforce the law

and it is desirable as a feature of any competition legal framework. In this regard, and based on the information and data considered, we believe that Chile has been relatively successful in the fulfilment of this requirement. In fact, the capacity to develop as a consultancy unit for the specific regulators in infrastructure sectors has increased through time. This process has been accomplished with major innovations and amendments to the legal framework. In the case of Argentina, through the introduction of law N° 25156 and its amendments, the legal framework derogated all competition attributes of other agencies and institutions, concentrating all in the competition agency. However, in practice, through the period of reference there has been a very small number of cases in which this attribution has been exercised by the Competition Commission. Finally, in the case of Perú there is not a clear definition of responsibilities in this regards. Considering electricity sector, there are a diversity of institutions dealing with the activities of co-ordination of energy distribution, fixing of tariffs, general regulation, fiscalisation and competition. The lack of a clear delimitation of responsibilities damages the effectiveness of the competition policy.

Related to the former point in the case of Perú, it is worth to highlight the lack of a unique Antitrust Agency with uniform attributes in all sectors; the Competition faculties are not centralised in one Agency. As mentioned before, in telecommunications, it is not INDECOPI but OSIPTEL who is in charge of enforcing the Competition Law. OSIPTEL acts as a sectorial regulator and also has competition responsibilities. This distorts the markets and reduces the effectiveness of the competition policy. In this case, there are also some overlapping of functions between the different government agencies. Related to the previous points, the asymmetry between sectors is also worth to highlight.

The former paragraphs aim at summarizing and deriving the main conclusions that come along the comparison between agencies. As mentioned, the second part of the present paper provides a quantitative analysis of the scope of antitrust enforcement.

In the first place, we provide different partial productivity indexes that aims at capturing the effectiveness of the antitrust agencies to enforce the competition law and allow us to compare between the different agencies considered. Focusing on the results of these indexes, the Argentinean and Chilean agencies can be described as small agencies in terms of personnel. However, in terms of budget, the Chilean agency is proportionately bigger than its Argentinean counterpart³¹. This is confirmed by the index budget per employee.

Considering indexes like “cases solved to budget” and “cases solved per employee” one can assess that the Argentinean Agency is relatively more efficient to finish a determined number of cases with the resources given, personnel and budget.

Regarding the information of fines to total cases solved, it seems that Perú tends to impose considerably more sanctions than the rest of the agencies under analysis. However, nothing is said about the real impact that these fines have on markets. In fact, this is one of the basic features of to the Peruvian agency.

From the comparison between countries on the evolution of fines imposed and its impact on markets we conclude that the performance of Argentina and Chile is better than Perú. The main difference between the first two is that Chile tends to impose less significant sanctions, while Argentina tends to impose high-impact fines in leading cases.

Finally, we apply the frontier estimation approach to measure and compare the performance of the antitrust agencies. We are implicitly assuming that the approach conducted by regulators when analyzing the performance of regulated firms can be

replicated to compare the performance of public agencies. We test whether the conclusions of the partial productivity section were confirmed on average when considering a broader analysis which is the estimation of a production frontier of the Competition Agency.

In the final specification of the model, we consider cases solved as product and personnel as the only input (labor intensive production function). The main conclusions of the estimations are the following:

- Personnel is significant to explain the variability of total cases. The sign of the coefficient is the one expected by the theory.
- Models have an adequate global adjustment.

Regarding the efficiency scores obtained from the models, the mean are comparable and quite similar. The standard deviation is also relatively similar between them. Through the frontier estimation, we conclude that Argentina is the relatively most efficient agency, followed by Chile and Perú.

However, it is important to emphasize that the conclusions derived that in both models, the Argentinean agency is the relatively more efficient one is particular to the sample consider. Frontier estimation is sensible to the number of observations and furthermore to the quality of the data used to conduct the analysis. In other words, it is very sensible to the presence of outliers and badly measured variables. Thus, all the discussion about data availability, data deficiencies and the assumptions made to obtain each figure are particularly relevant in this point and therefore, they are more than relevant when deriving the conclusions.

Finally, it must be said that having in mind the drawbacks and limitations of the information considered allow us to emphasize the importance of adequate data sets in order to make comparisons and increase the information that policy makers have to take their decisions.

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NOTES

¹ Comisión Nacional de Defensa de la Competencia, in Spanish.

² Tribunal Nacional de Defensa de la Competencia, in Spanish.

³ Comisión Nacional de Defensa de la Competencia, in Spanish.

⁴ Until June 2003 CNDC reported to the Competition, Deregulation and Consumer Defense Secretariat (SDCyCD), which in turn was under the Ministry of Production. New government has created the aforementioned Technical Co-ordination Secretariat to which the CNDC and the consumer defense Agency directly reports. In turn, the Secretariat reports directly to the Ministry of Economy and Production, which resulted from the merger of former Economy and Production Ministries.

⁵ *Resolution SCDyDC N° 40/01* "Guidelines for the Notification of Economic Concentration Operations" establishes the formalities and procedures that shall be observed by notifying Parties. There are three different forms. Forms F1 and F2 are standardized forms for simple and complex operations, respectively. Form F3 is a customized form for the particular case, issued by the Commission to obtain detailed information in very complex cases.

⁶ *Resolution SCDyDC N° 164/01*, ("Guidelines for Controlling Economic Concentration Operations") sets the economic methodology for assessing the competitive impact of a merger. The "Guidelines" focuses on horizontal mergers, but it also has a short reference to assessment of vertical and conglomerate mergers.

⁷ The Act contemplates in Article 10 hypothesis where the transaction is not subject to notification. Those particular cases are: a) acquisition of a company where the buyer previously owned more than 50% of the shares; b) acquisitions of bonds, debentures, shares without voting rights or debts issued by companies; c) acquisition of a single company by a single foreign company, which previously did not own assets or shares of companies operating in Argentina and d) acquisition of a company in bankruptcy, with no activity during the last year. Also there is a final e) exemption, which takes place when an operation involved companies under the notification threshold, but the amount of the contract AND the value of the assets acquired, absorbed, transferred or controlled do not each one exceed the amount of Pesos \$ 20 million. This exception is only valid if it is not the case that: a) in the previous twelve (12) months there has been operations that in the aggregate exceed the amount of Pesos \$ 20 million, or b) in the previous thirty six (36) months there has been operations that in the aggregate exceeds the amount of Pesos \$ 60 million. In both a) and b) cases, operations must be referred to the same market.

⁸ Tribunal Nacional de Defensa de la Competencia, in Spanish.

⁹ Comisión Nacional de Defensa de la Competencia, in Spanish.

¹⁰ Accordingly to the Act, the Jury has been constituted by the General Attorney of the Government, the Secretariat for Trade, Industry and Mining of the Ministry of Economy, the Presidents of both High and Low Congress Chambers Committees for Trade, the President of the National Court for Appeals on commercial subjects and the Presidents of both the National Academy of Economics and the National Academy of Law.

¹¹ Article 5° defines abuse of dominant position in the market as a situation in which one or several companies being in a dominant position act unduly in order to obtain benefits and cause damages to third parties, which would not have been possible if such dominant position did not exist. Therefore, it refers to a situation where a firm or a set of them can act independently without taking into account its or their competitors, due to factors like significant market shares, the attributes of supply and demand, barriers to entry, technological developments, etc.

¹² Regarding restrictive practices affecting free competition, the Decree defines them as those practices like agreements, decisions, recommendations, parallel actions or agreed practices among companies that restrict, impede or falsify, or may restrict, impede or falsify, the competition.

¹³ There are no express exclusions in the competition law. As in other countries, statutory monopolies do exist and there are instances when laws (such as those governing intellectual property) grant exclusive rights. Since possession of a monopoly is not a violation, these laws do not actually create exclusions, as long as abuse of the monopoly or exclusive right is subject to the law. In Chile, this is generally, and perhaps universally, the case. For example, Chile accords the usual kinds of intellectual property rights, and also provides that anticompetitive use of those rights can be penalised under the competition law. Chile's Constitution provides that the state is the sole owner of all mines, regardless of who owns the surface land; this includes ownership

of the right to explore for and exploit liquid and gaseous hydrocarbons. It appears, however, that the competition law would apply if the state acted to abuse its monopoly.

¹⁴ Fiscalía Nacional Económica, in Spanish.

¹⁵ Comisión Resolutiva, in Spanish.

¹⁶ Comisión Preventiva, in Spanish.

¹⁷ The data set used in this paper was constructed. In some cases, the disclosure of some variables was not disclosed as desirable. Then it was necessary to make some assumptions (See Appendix).

¹⁸ A point to highlight is that Argentinean budget was calculated in dollar before economic crisis and a big devaluation of exchange rate at the end of 2001. In this sense this number is not representative of a equilibrated budget for this Commission.

¹⁹ Implicitly it is assumed that the distribution of cases dealt between the different departments is constant which is a caveat of the approach.

²⁰ Due to price differences and access to gas connections, in Argentina a great proportion of Propane Gas is used by poor consumers (residential, commercial and others).

²¹ Chile's telecommunications industry has been privatised. To a great extent, it is owned by foreign companies. The telecoms law states that providers may generally set the price for their services, except for access charges which are always fixed. Other prices may be fixed if the Antitrust Commission finds that competitive conditions do not exist. In practice, this means that Chile's telecom regulator sets tariffs for local fixed telephony (pursuant to Antitrust Commission rulings) and for access charges; in the mobile market, only access prices can be fixed, and long distance charges are free by law.

²² Resolution of "Free Competition Commission" of Perú.

²³ The Index (Conduct Fined Cases) is used to measure Agencies' performance and it is calculated as follows:

- $\sum [0.5 \cdot (A_i \cdot (\text{U}\$ \text{ Fine} / \text{U}\$ \text{ Gross Technical Profits})_i) + 0.5 \cdot (A_i \cdot (\text{Total Fine U}\$ / \text{Maximun Fine})_i)]$
- i (Number of Cases)= 1 to 3 . Years 1996 to 2004
- $A_i \in$ to [0,1]. This parameter indicates the relevance of the company that was fined. In all the cases it was assumed that $A_i=1$, because each company is the largest or one of the most significant in that sector, in terms of market share.

²⁴ Modern regulatory regimes are focused on improving technical efficiency through incentive mechanisms. Among these, yardstick competition, is a must. Yardstick competition, originally proposed by Shleifer (1985) requires the horizontal separation of some of the stages of the natural monopoly industries in order to obtain comparative information on relative efficiency levels. This information can then be used to set up tariffs for the regulated companies allowing some efficiency gains to be passed on to consumers and preserving at the same time incentives for the firms to reduce their own costs.

The principles of yardstick competition are quite simple consisting in defining prices, revenues and quality standards based not on data of the own company, as this would eliminate all incentives to improve efficiency, but on the average of a sample of comparable companies. In other words, the regulator acting as the principal prefers to have several agents in order to reduce the existing asymmetry of information. In exchange for this superior knowledge some economies of scale and or scope are lost when the activity is separated into different units.

Efficiency measures are an important tool for regulators, showing how much a firm can rise its output without using more inputs.

²⁵ This requires developing objective measures to screen the functioning and the operation of the different natural monopolies through time in order to promote competition, give incentives to cost minimization and ensure that, eventually, users benefit from these cost reductions.

²⁶ Non-statistical methods estimate frontiers (which can be parametric or non-parametric) without assumptions on the form of the distribution of the error term. The estimates as a result have no statistical properties making it impossible to test hypothesis. In the case of estimates using mathematical programming, the frontier can or not be specified as a parametric function of inputs (obviously, statistical methods are always parametric). The main advantage of non-parametric methods (also known as Data Envelope Analysis or DEA for short) is that no a priori functional form is imposed on the data. The main disadvantage is that to

estimate the frontier it uses only a subset of the available data (those actually determining the frontier), while the rest of the observations are ignored.

²⁷ An additional disadvantage of deterministic estimates is the high sensibility to outliers. A single outlier observation can have strong effects on the results. Moreover, increasing the size of the sample can not solve the problems associated with the “outlier problem”. The estimation of deterministic frontiers assumes a one-sided error term, implying that it is possible to define exactly the minimum necessary cost to produce a given level of output. Therefore, the actual cost is given by the minimum cost plus an inefficiency term (which by definition is equal or greater than zero). Clearly, the underlying assumption is that all external events which might affect the cost function are the same (and with equal intensity) for all firms.

²⁸ In this regard, the quality deficiency of the data might contribute to explain the non significance of this variable.

²⁹ For a regression like: $y_{it} = a + x_{it} * B + u_i + e_{it}$, this model assumes that $E(u_i) = E(e_{it}) = 0$; $E(e_{it}^2) = \sigma_e^2$; $E(u_i) = \sigma_u^2$; $E(e_{it} u_j) = 0$ for all i, j and t ; $E(e_{it} e_{js}) = 0$ if $t \neq s$ or $i \neq j$ and $E(u_i u_j) = 0$ if $j \neq i$.

³⁰ In the case of Argentina in 1999 Law N° 22.262 was replaced by Act 25.156 which among other things, created the National Tribunal for Competition Defense -TNDC³⁰ as an independent body to enforce the law within the Ministry of Economy. The Amendment of the Law aimed at increasing the enforcing power of the Antitrust Agency. Even though the Law establishes the creation of TNDC, the CNDC still is in charge of enforcing the Competition Law. The TNDC is in process of constitution. CNDC is the agency that performs the investigations, which end up in reports and recommendations based on the legal and economic antitrust principles. Both mergers and antitrust investigations are subject to the antitrust analysis performed by CNDC.

³¹ A point to highlight is that Argentinean budget was calculated in dollar before economic crisis and a big devaluation of exchange rate at the end of 2001. In this sense this number is not representative of a equilibrated budget for this Commission.

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